IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

PRINCETON DIGITAL IMAGE CORPORATION,
 	
    Plaintiff,
v.
 	
CANON INC., *et al.,*
 	
    Defendants.
	Civil Action No. 1:12-cv-00779 (RJS)

DEFENDANTS' OPENING CLAIM CONSTRUCTION BRIEF

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Defendants Hewlett-Packard Company ("HP") and FUJIFILM North America Corporation ("Fujifilm") respectfully submit this opening claim construction brief for the two patents asserted by Princeton Digital Image Corporation ("PDIC"), United States Patent Nos. 4,860,103 ("the '103 patent") and 4,813,056 ("the '056 patent").

I.   INTRODUCTION

The asserted patent claims are exceedingly complex and require construction by the Court so a jury can understand them at trial, and so the Court and the parties can properly analyze whether any genuine dispute of material fact makes trial necessary. PDIC nonetheless urges the Court not to construe most claim terms. Instead, PDIC asks the Court to declare that claims have a "plain and ordinary meaning" when they have none, in an effort to leave the claims ambiguous. When PDIC chooses to offer constructions, it does so either to try to save claims from indefiniteness by improperly importing limitations from the specification, or to create additional ambiguity that may help PDIC avoid summary judgment and confuse the jury at trial. By contrast, Defendants' constructions are supported by the intrinsic record and will assist the jury in understanding the asserted claims. That is the proper purpose of claim construction and the role assigned to the Court in construing the claims.

II.   LEGAL STANDARDS

A.   Claim Construction

Claim construction is a matter of law for the Court. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-17 (Fed. Cir. 2005) (*en banc*). Claim construction focuses on intrinsic evidence— the claims, specification, and prosecution history—because it is "the most significant source of the legally operative meaning of disputed claim language." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996). Claims must be interpreted from the perspective of a person of ordinary skill in the relevant art at the time of the invention. *Phillips*,

415 F.3d at 1313. A court must start by examining the claim terms themselves, *Phillips*, 415 F.3d at 1312-13, and remain centered on the words of the claims throughout. *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001). If the ordinary meaning of a term is "readily apparent," the construction of it involves "little more than the application of [its] widely accepted meaning…." *Phillips*, 415 F.3d at 1314. Claims "must be read in view of the specification, of which they are a part." *Markman*, 52 F.3d at 979. The specification is often "the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315. The prosecution history must also be reviewed as "evidence of how the PTO and the inventor understood the patent" because it represents the patentee's attempts "to explain and obtain the patent." *Phillips*, 415 F.3d at 1317. The prosecution history can illuminate the claim meaning by showing how the patentee understood the invention. *Vitronics*, 90 F.3d at 1582-83. It may also play a particularly important role where the patentee has limited the meaning of claim terms in a way to overcome objections by the United States Patent and Trademark Office ("PTO") based on prior art. *Phillips*, 415 F.3d at 1317. Extrinsic evidence, such as inventor and expert testimony, dictionaries, and treatises, may aid the court in understanding the meaning of the claim terms to one of ordinary skill in the art. *Phillips*, 415 F.3d at 1317. This evidence may only be used so long as it "does not contradict any definition found in or ascertained by a reading of the patent documents." *Id.* at 1322-23.

B.   Means-Plus-Function Claims

Several of the disputed claim terms are written in means-plus-function format. Section 112, paragraph 6 allows a patentee to express a claim limitation as a "means or step for performing a specified function without the recital of structure, materials, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. §112, ¶ 6. Determining whether a claim term is a means-plus-function limitation is a matter of claim construction for the

Court. *Cardiac Pacemakers*, *Inc. v. St. Jude Med.*, *Inc.*, 296 F.3d 1106, 1113 (Fed. Cir. 2002).

Claim limitations using the term "means" presumptively invoke §112, ¶ 6. *Kemco Sales*, *Inc. v.*

Control Papers Co., *Inc.*, 208 F.3d 1352, 1361 (Fed. Cir. 2000). A party seeking to rebut this

presumption must show that the claim itself recites structure "sufficient to perform the claimed

function in its entirety." *Altiris, Inc. v. Symantec Corp.*, 318 F.3d 1363, 1375 (Fed. Cir. 2003).

Construction of means-plus-function terms involves two steps: (1) identifying the

claimed function, which most often is simply the function recited in the claim following "means"

or similar language; and (2) locating in the intrinsic record the precise structure the patent

identifies as corresponding to the recited function. *Biomedino v, LLC v. Waters Techs. Corp.*,

490 F.3d 946, 950 (Fed. Cir. 2007). Section 112, paragraph 6 requires patentees to point in the

specification to specific structure that performs the recited function (in lieu of putting it in the

claim). *Id.* at 948. The corresponding structure of a means-plus-function limitation therefore

comprises the specific structure that the specification clearly links to the recited function. *B.*

Braun Medical v. Abbott Labs, 124 F.3d 1419, 1424 (Fed. Cir. 1997). Where the specification

discloses a single structure corresponding to the recited function, the claim is limited to that

structure. *Cortland Line Co. v. Orvis Co.*, 203 F.3d 1351, 1357 (Fed. Cir. 2000).

If the specification fails to disclose sufficient structure corresponding to the recited

function of a means-plus-function term, then the claim is indefinite and fails to meet the

requirements of 35 U.S.C. §112, ¶2. *Biomedino*, 490 F.3d at 950. For the structure disclosed to

be sufficient, it "must be disclosed in such a manner that one skilled in the art will know and

understand what structure corresponds to the means limitation." *Id.* It is not enough that one of

ordinary skill in the art would be capable of understanding or implementing a structure to

perform the recited function—the specification must identify the necessary corresponding

structure. *Id.* at 950.

C.   Indefiniteness Is a Matter of Claim Construction

Whether a claim is indefinite under 35 U.S.C. § 112, ¶ 2 is a "legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims." *Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1378 (Fed. Cir. 1999). Each claim in a patent must have a "precise claim scope." *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1251 (Fed. Cir. 2008). Section 112 insures the public is given notice of exactly what is claimed and that a patentee's competitors can "determine whether or not they infringe." *All Dental Prodx, LLC v. Advantage Dental Prods., Inc.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002).

A patentee violates 35 U.S.C. § 112, ¶ 2 if "a skilled artisan could not discern the boundaries of the claim based on the claim language, the specification, and the prosecution history, as well as her knowledge of the relevant art area." *Halliburton*, 514 F.3d at 1249-50. Claims that are not amenable to construction or are insolubly ambiguous are indefinite. *Id.* at 1249. Even if the definition of a claim term can be reduced to words, it "is still indefinite if a person of ordinary skill in the art cannot translate the definition into meaningfully precise claim scope." *Id*. at 1251. And "courts may not redraft claims, whether to make them operable or to sustain their validity." *Chef America Inc. v. Lamb Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004). Even if the only reasonable interpretation results in a nonsensical construction of the claim, the court may not substitute words as the patentees wish they had written them. *Id*.

III.   THE PROPER CLAIM CONSTRUCTIONS FOR THE '103 PATENT

A.   Background of the '103 Patent

The '103 patent was filed on October 9, 1986 and issued on August 22, 1989. The patent expired on October 9, 2006. PDIC has asserted claims 1, 3-7 and 11 (independent claims underlined). The '103 patent is directed to a digital video coder used to digitize an analog video signal received from a camera to maintain the gray level of the output digitized video signal— that is, brightness level extending between white and black within a predetermined range. A key

component of the video coder is an analog-to-digital converter ("ADC") having a control input

for varying the sensitivity or gain of the controller. In the patent, the sensitivity is controlled by

supplying a reference signal (Vref) to a control input of the ADC. The ADC produces a digital

output X defined by $X = 255 \times Vin/Vref$, where Vin is the amplitude of the input analog video

signal, whereby the value of the digital output X is restricted to the range of 0 through 255.

The reference voltage Vref is supplied by a feedback controller depicted as item 10 in

Figure 1. The function of the controller 10 is to adjust the converter gain (sensitivity) to

compensate for variations in video input amplitude. Specifically, the gain is adjusted to bring the

video input signal within the dynamic range of the ADC (item 2) so as to maintain the grey level

of the input to the ADC within a predetermined range of the ADC. In the preferred embodiment,

the feedback controller 10 temporarily stores successive samples of the digital output of the ADC

2. To maintain the correct grey level, the controller uses the following algorithm:

A flowchart indicating controller operation is shown in FIG. 3. A brief description of the each step in the process is given below.

1 The microprocessor ports are initialised as inputs/outputs after reset, the gain is also set to minimum.

2 The accumulator, and counts, are reset.

3 A sample is latched.

4 The sample is accepted only if it were taken during the active line period.

6 It is discarged if it is same value as the previous one.

5 Or if it is at black level (zero amplitude).

7 The watchdog timer is reset, so that it does not normally reach its maximum count. If the maximum count is reached, a system fault is indicated and a reset to step **1** is initiated.

8 The sample count is incremented.

9 The samples are checked to ensure that they fall in the central range of FIG. **2**. If not:

16 A count is incremented of "super white" or "super black" signals.

17 If the total sample cunt has not reached 100, return for a further sample, otherwise

18 If the count of super Whites is ten or more, or that of super Blacks is 90 or more, the reference voltage is adjusted (step **19**) by one step (eg 10 mV on a 1 V nominal reference voltage) in the appropriate direction. and the cycle is repeated.

10 Otherwise the in-range sample count is incremented.

11 If the sample is the same as the first of the current accumulation, ignore it (resetting—step **20**—the total sample count and in-range sample counts) and return for another sample.

12 The sample is added to an accumulator.

13 If the in-range sample count has not reached 100, return for a further sample.

14 If the accumulated total is not within ±15% of a target value (eg 50% of peak white, corresponding to

a total of 127 times the in-range sample count) then the gain is adjusted by an amount proportional to the difference between the total and the target value. Otherwise (2) the accumulator and "super white" and "super black" counts are reset and the cycle repeated.

15 The adjustment of the gain is carried out during the horizontal blanking period of the video signal so as to eliminate switching transients and noise from the display.

No other algorithm or process corresponding to the claimed "control means" or controller

appears in the specification.

B.   Disputed Claim Terms for the '103 Patent

1.   "a video input for receiving analogue video signals directly from a camera" (Claims 1, 11)

Claim Language	Defendants' Construction	PDIC's Construction
A digital video coder comprising <u>a video input for receiving analogue video signals directly from a camera</u>	an analog video input in the video coder that is connected directly to a standalone camera device that captures and processes images electronically to output analog video signals to receive analog video signals via a fixed transmission link or after being filtered or otherwise processed at the standalone camera device output, in contrast to receiving broadcast television signals	a video input for receiving analogue video signals over a wired transmission link from a device that includes a light-tight enclosure containing an aperture through which the light from an object passes and forms an image on a light sensitive material and circuitry to generate analog video signals representative of the formed image

The main dispute centers on the phrase "directly from a camera." Defendants' construction is consistent with the '103 patent, which teaches receiving a video signal at a separate video coder device from a standalone camera. PDIC's proposed construction seeks to blur this distinction.

The apparatus of claims 1 and 11 is directed to a "digital video coder." According to the claim language, the digital video coder receives an input from an external source—a camera. In other words, the digital video coder does not include any components to capture images, nor is the digital video coder included <u>within</u> a camera. The intrinsic evidence supports this reading of the claim language. For instance, Figure 1 is described as "an apparatus according to the present invention." Ex. A, '103 patent 1:33-34. Because the claims should, if possible, be construed to read on the patent disclosure, this apparatus must constitute a "digital video coder" as recited in claims 1 and 11. The inputs 1, 5 and 6 are depicted as coaxial video input terminals for receiving connections from an external camera device. The only camera disclosed in the patent is a separate security system camera connected to the video coder. Ex. A, '103 patent 3:33-36. The patent contains no disclosure at all that the digital video coder and camera are the same device. Rather, Figure 1 and the specification describe the controller and the ADC as separate and distinct devices, and the specification clearly delineates when components are separate from one another and when components are included within the decoder. *Arlaine & Gina Rockey, Inc. v.*

Cordis Corp., 175 Fed. Appx. 329, 333 (Fed. Cir. 2006) (using language from specification to demonstrate how the patentee intended for some components to be physically separate and some to be included in others). The specification teaches that "reference voltage Vref is supplied by a feedback controller, indicated generally at 10, which latches samples <u>from the digital output</u> 3 [of the ADC]." Ex. A, '103 patent 1:60-62 (emphasis added). Step 15 of the disclosed algorithm for the controller states that in the digital video coder, "[t]he adjustment of the gain is carried out during the horizontal blanking period of the video signal so as to eliminate switching transients and noise <u>from the display</u>." Ex. A, '103 patent 3:6-9 (emphasis added).

Thus, there can be no dispute that the digital video coder and the display are separate devices. When the patentee intended to describe components within the same device, the patentee used the terms "comprising" and "incorporated" in the specification and "including" in the claims to identify components of other structures. Ex. A, '103 patent 2:1-15; claim 3. To interpret the claims in any other way would require that a structure connect to itself and receive data from itself. The Federal Circuit has consistently admonished such illogical constructions. *See, e.g., ImageCube LLC v. The Boeing Co.,* 2011 WL 2438634, *3 (Fed. Cir. 2011).

The prosecution history further emphasizes that the digital video coder and camera are physically separate devices. During prosecution, the applicant amended the claims to distinguish prior art on the ground that the digital video coder receives the video signals "directly from a camera." Ex. B, Oct. 24, 1988 Response to Office Action at 1, 3. The applicant stated what is meant by "directly from a camera":

> As used in the claims, the language receiving video signals "directly" from a camera output indicates that the video coder may receive the camera output from a fixed transmission link or, for example, from a switch to select between camera outputs, a mixing desk for compensating for fading between cameras, etc.

Id. Throughout the prosecution history, the applicant consistently refers to "directly" as being from a camera output or otherwise receiving the camera output from a fixed transmission link.

Thus, the claimed A/D conversion and variable gain control do not occur within the camera. Because of this clear disclaimer, PDIC cannot rely on an equivalents argument to read the camera device and the video coder as the same device.

Defendants' construction correctly captures the required physical separateness of the two devices and adopts the precise language the patentee used to distinguish the alleged invention over the prior art. PDIC's construction introduces ambiguity to the claim language. For example, PDIC replaces the term "directly" with "wired transmission link." That phrase appears nowhere in the intrinsic record. PDIC's construction also proposes a convoluted definition of the word "camera." The critical aspect of these claims is that the video coder receives a signal from a separate camera device; the video coder is not integrated with the camera. Finally, Defendants' construction correctly captures the distinction between the claimed "direct" signals and the prior art "broadcast" signals made by the applicant during prosecution. The applicant emphasized that this distinguished the invention from the prior art:

> In this fashion, the claimed invention has been defined to more clearly distinguish over systems having a video input at the receiver end of a transmission system which receives broadcast television signals instead of receiving video signals "direct" from a camera.

Ex. B, Oct. 24, 1988 Response to Office Action at 3, 5-6. Defendants correctly include this aspect of "directly" in their proposed construction.

2. "control means" (Claims 1, 11)

Claim Language	Defendants' Construction	PDIC's Construction
Claim 1: control means responsive to the digital words at the output of the converter to generate digitally, as a function of the average amplitude level represented by previous said digital words at the converter output, a control signal for application to the control	Defendants contend this phrase is subject to 35 U.S.C. § 112(6). *Function:* responsive to the digital words at the output of the converter to generate digitally, as a function of the average amplitude level represented by previous said digital words at the converter output, a control signal for application to the control input of the converter	Ordinary meaning; no construction necessary. PDIC disagrees that this term is governed by 35 U.S.C. § 112(6) and believes that this term does not need to be construed, particularly given that one or more terms/phrases within this phrase are already submitted for construction or have an agreed construction. Alternately, if the Court determines that the language in question is subject to construction under 35 U.S.C. § 112(6)—which PDIC

Claim Language	Defendants' Construction	PDIC's Construction
input of the converter	***Structure:*** a controller having a processor that executes the algorithm of Fig. 3 and accompanying text in Column 2, lines 32-68 to Column 3, lines 1-9. Defendants object to PDIC's untimely disclosure of an alternative construction under 35 U.S.C. § 112(6).	disputes—then PDIC proposes: **Function**: "generate digitally, as a function of the average amplitude level represented by previous said digital words at the converter output, a control signal for application to the control input of the converter" **Structure**: a controller 10 having a processor 11 that partially executes the algorithm shown and described in the Abstract, Col. 1, ll. 19-24, Col. 2, ll 19-22 and ll. 28-30 and in Fig. 3 (steps 12, 13) and the accompanying text, and statutory equivalents thereof.
Claim 11: control means responsive to the digital words at the output of the converter to generate digitally, as an arithmetic function of the amplitudes represented by the digital words at the converter output, a control signal for application to the control input of the converter for controlling the average level represented by said digital words by maintaining the average level of said digital words within a predetermined range	Defendants contend this phrase is subject to 35 U.S.C. § 112(6). ***Function:*** responsive to the digital words at the output of the converter to generate digitally, as an arithmetic function of the amplitudes represented by the digital words at the converter output, a control signal for application to the control input of the converter for controlling the average level represented by said digital words by maintaining the average level of said digital words within a predetermined range ***Structure:*** a controller having a processor that executes the algorithm of Fig. 3 and accompanying text in Column 2, lines 32-68 to Column 3, lines 1-9. Defendants object to PDIC's untimely disclosure of an alternative construction under 35 U.S.C. § 112(6).	Ordinary meaning; no construction necessary. PDIC disagrees that this term is governed by 35 U.S.C. § 112(6) and believes that this term does not need to be construed, particularly given that one or more terms/phrases within this phrase are already submitted for construction or have an agreed construction. Alternately, if the Court determines that the language in question is subject to construction under 35 U.S.C. § 112(6)—which PDIC disputes—then PDIC proposes: **Function**: "generate digitally, as an arithmetic function of the amplitudes represented by the digital words at the converter output, a control signal for application to the control input of the converter" **Structure**: a controller 10 having a processor 11 that partially executes the algorithm shown and described in the Abstract, Col. 1, ll. 19-24, Col. 2, ll 19-22 and ll. 28-30 and in Fig. 3 (steps 12, 13) and the accompanying text, and statutory equivalents thereof.

a.   "Control Means" Is a Means-Plus-Function Limitation

The "control means" limitation in claims 1 and 11 is written in means-plus-function

format and therefore must be construed as a means-plus-function limitation. The use of the word

"means" presumptively invokes § 112, ¶ 6. *Kemco Sales*, 208 F.3d at 1361. The claims recite

the function of the control means, "responsive to said signal…to generate digitally…a control

signal," according to specific rules. But the claims recite no structure for carrying out this

function. '103 Patent at claims 1, 11; Ebrahimi Decl. at ¶¶ 20-22.[1] Thus, PDIC has no basis to overcome the presumption favoring application of Section 112, paragraph 6. Despite this, PDIC contends that the term "control" combined with a description of the function of the control means, connotes sufficient structure to avoid means-plus-function treatment. PDIC's argument is illogical and lacks legal support.

The Federal Circuit has consistently construed claim limitations reciting a "control means" as invoking § 112, ¶ 6. In *Biomedino, LLC v. Waters Techs. Corp.,* the claims recited a "control means for automatically operating valves." 490 F.3d 946, 949 (Fed. Cir. 2007). There, the patentee argued that the word "control" in conjunction with "means" took "control means" outside the realm of means-plus-function language. *Id*. at 950. The Federal Circuit rejected this argument because the "reference to 'control' is simply an adjective describing 'means:' it is not a structure or material capable of performing the identified function." *Id.* at 946. The same is true here—the reference to "control" in claims 1 and 11 is merely an adjective describing the word "means," and the claims recite no structure for performing the recited function.

b.   The Proper Function and Corresponding Structure of the "Control Means"
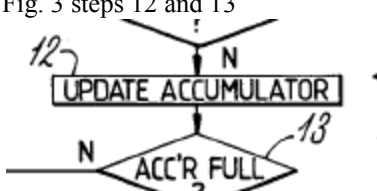
Function[2]	Corresponding Structure
Claim 1 - responsive to the digital words at the output of the converter to generate digitally, as a function of the average amplitude level represented by previous said digital words at the converter output, a control signal for application to the control input of the converter Claim 11 - responsive to the digital words at the output of the converter to generate digitally, as <u>an arithmetic function of the amplitudes represented by the</u> digital words at the converter output, a control signal for application to the control input of the converter <u>for controlling the average level represented by said digital words by maintaining the average level of said digital words within a predetermined range</u>	a controller having a processor that executes the algorithm of Fig. 3 and accompanying text in Column 2, lines 32-68 to Column 3, lines 1-9.

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[1] It is Fujifilm's position that the Ebrahimi declaration provides a useful explication of matters in the patents in suit, but that neither that declaration nor declarations submitted by PDIC are necessary to a proper construction of the disputed claim terms.

[2] The underlined text highlights the differences between the functions of claims 1 and 11. Although claim 11 includes additional language, the structure for both claims is the same.

The parties agree that the controller disclosed in the specification constitutes the basic structure for the "control means" function, but disagree about what algorithm the controller must operate to perform the function. The only algorithm disclosed in the specification for performing the function of the control means is the one disclosed in Figure 3 and its accompanying text at column 2, line 32 through column 3, line 9. Ebrahimi Decl. at ¶¶ 23-26. The specification discloses no other algorithm for performing the function of the control means. *Id.* PDIC attempts to cherry-pick portions of the specification to obtain a broader structure than the patentee originally bargained for when drafting the underlying patent application. The table below summarizes PDIC's alleged structure:

PDIC Cited Structure	Actual Disclosure From the Citations	
Abstract	"An analog-to-digital converter 2 for video signals has a sensitivity (reference) input 4 controlled by a controller 10 in response to the converter's digital output so as to maintain the grey level with a predetermined range. Preferably the controller employs an irregular subsampling of the digital values, and responds differently to extreme and mid-range samples. A scale factor may be forwarded to a digital-to-analog converter for reconversion."	
Col. 1, ll. 19-24	"and control means responsive to the digital words at the output of the converter to generate digitally, as a function of the amplitudes represented by previous digital words at the converter output, a control signal for application to the control input of the converter."	
Col. 2, ll 19-22 and ll. 28-30	"The function of the controller is to adjust the converter gain to compensate variations in video input amplitude. The aim is to maintain the grey level within a pre-determined range and thus samples representing" "In-range samples are accumulated and if the mean is not within the deemed grey-level range, an adjustment is made to Vref in proportion to the deviation."	
Fig. 3 (steps 12, 13) and the accompanying text	Fig. 3 steps 12 and 13	Text for steps 12 and 13 from specification: "12 The sample is added to an accumulator. 13 If the in-range sample count has not reached 100, return for a further sample"

The Abstract is a generic overview of the alleged invention and contains nothing close to a recitation of structure sufficient to perform the claimed function. Ebrahimi Decl. at ¶ 29. The citation to column 1 merely restates the claim language verbatim, and column 2 recites in broad terms the "function of the controller," not the underlying structure or algorithm. *Id.* PDIC's citations to Figure 3 and the text for steps 12 and 13 fare no better. These steps relate only to

updating the accumulator, a function not recited until dependent claim 3, and which cannot be executed outside the overall algorithm. *Id.* at ¶¶ 24-29. PDIC even omits the step that generates the control signal, which it expressly identified as part of the function. Because PDIC's proposed construction fails to identify sufficient structure to perform the function of the control means, the Court should reject it in favor of Defendants' proper construction. *Id.*

3. "means for sampling" (Claim 3)

Claim Language	Defendants' Construction	PDIC's Construction
means for sampling selected words and for accumulating a sum of a predetermined number of the selected words and to apply to the said control signal a correction proportional to the difference between the accumulated sum and a reference value	Defendants contend this phrase is subject to 35 U.S.C. § 112(6). *Function:* sampling selected words and accumulating a sum of a predetermined number of the selected words and to apply to the said control signal a correction proportional to the difference between the accumulated sum and a reference value *Structure:* a controller having a processor that executes the algorithm of Fig. 3 and accompanying text in Column 2, lines 32-68 to Column 3, lines 1-9. Defendants disagree that the portion "means for sampling selected words and for accumulating a sum of a predetermined number of the selected words" represents the entire means plus function phrase and rather contend that this phrase must be construed in context as part of the entire means plus function clause, and that this phrase does not otherwise require construction. To the extent the Court construes this portion separately: *Function*: sampling selected words and accumulating a sum of a predetermined number of the selected words. *Structure*: a controller having a processor that executes steps 1-13 of Fig. 3 and accompanying text at Column 2, lines 32-68 to Column 3, lines 1-9.	PDIC contends that this phrase is governed by 35 U.S.C. § 112, ¶ 6, but disagrees with Defendants' identification of the function. PDIC believes that only a portion of this phrase is the identified function: **Function**: "sampling selected words and accumulating a sum of a predetermined number of the selected words" **Structure**: a controller 10 having a processor 11 that partially executes the algorithm shown and described in the Abstract, Col. 1, ll. 19-24, Col. 2, ll 19-22 and ll. 28-30 and in Fig. 3 (steps 12, 13) and the accompanying text, and statutory equivalents thereof.

The parties agree that this phrase is a means-plus-function phrase, but disagree about the proper function and structure. PDIC is attempting to rewrite the claim language as it wishes the patentee would have drafted it, but the ambiguity in the claim must be construed against the patentee. *Athletic Alternatives, Inc. v. Prince Mfg., Inc.*, 73 F.3d 1573, 1581 (Fed. Cir. 1996).

a. The Proper Function of "Means for Sampling"

This means phrase includes three separate functions: (1) sampling; (2) accumulating; and (3) applying. PDIC's proposal includes two of the three functions, but ignores the third phrase

"and to apply to the said control signal a correction proportional to the difference between the accumulated sum and a reference value." Under PDIC's proposed construction, this phrase (a process limitation) becomes a separate claim element in the apparatus claim. If the Court adopted PDIC's proposal, the claim would be invalid as indefinite for mixing apparatus and process claim limitations. *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.2d 1377, 1384 (Fed. Cir. 2005). Because the Court should construe the claims to preserve validity where possible, it should reject PDIC's proposed function.

        b.   **The Proper Corresponding Structure for "Means for Sampling"**

The parties agree that the controller constitutes part of the structure, but disagree about the algorithm it must run to accomplish the claimed function. Both parties identify the same structure for this means limitation as they did for the "control means," and PDIC's recitation of the structure is improper for the same reasons discussed above in Section III.C.2. The correct corresponding structure is "a controller having a processor that executes the complete algorithm of Fig. 3 and accompanying text in Column 2, lines 32-68 to Column 3, lines 1-9."

        4.   **"analogue-to-digital converter" (Claims 1, 11)**

Claim Language	Defendants' Construction	PDIC's Construction
an <u>analogue-to-digital converter</u> connected to the input and having an output for providing digital words representing successive samples of the input video signals and a control input for varying the sensitivity of the <u>converter</u>	plain and ordinary meaning: "a device in the video coder that changes a continuously variable analog input into digital values"	a variable sensitivity device that produces digital words at its output in response to input analog signals

The analog-to-digital converter of the '103 patent is an electronic component that receives a continuously variable input analog signal and changes that variable signal into a sequence of digital words (values) with the gain of the converter being adjustable such that the analog input can be represented by the available range of digital output values. Ex. C, IEEE Standard Dictionary of Electrical and Electronics Terms, 4th Ed., 1988, p. 38 ("A device that converts a signal that is a function of a continuous variable into a representative number

sequence."). Defendants' construction applies this well-understood meaning, while PDIC's proposal improperly introduces the term "variable sensitivity device," which is part of a separate claim limitation the parties have asked the Court to construe. *See* Section III.C.5, *infra*.

5. "a control input for varying the sensitivity of the converter" (Claims 1, 11)

Claim Language	Defendants' Construction	PDIC's Construction
an analogue-to-digital converter connected to the input and having an output for providing digital words representing successive samples of the input video signals and <u>a control input for varying the sensitivity of the converter</u>	an input that receives the control signal generated by the control means to adjust the relationship in the analog-to-digital conversion process between the voltage of the input analog signal to the analog-to-digital converter and the corresponding digital output value of the analog-to-digital converter	a control input for varying the relationship in the production process between the input analog signals and the corresponding output digital words

The parties agree on two points: (1) sensitivity involves the relationship between the input analog signals and the output digital signals; and (2) the control input controls this relationship. Defendants' construction adopts these two principles and provides explanatory language to assist the jury in deciphering this claim term. PDIC's construction introduces the term "production process," which is undefined and has no support in the intrinsic record. On this basis alone, the Court should reject PDIC's proposal.

6. "a control signal for application to the control input of the converter" (Claims 1, 11)

Claim Language	Defendants' Construction	PDIC's Construction
control means responsive to the digital words at the output of the converter to generate digitally, as a function of the average amplitude level represented by previous said digital words at the converter output, <u>a control signal for application to the control input of the converter</u>	a digital signal applied to the control input of the analog-to-digital converter	Ordinary meaning; no construction necessary. Alternatively, to the extent that the Court determines a construction is necessary, PDIC proposes: "a control signal for application to the control input of the analog-to-digital converter"

The control signal is the output of the control means and is fed to the control input of the analog to digital converter. PDIC disagrees with the obvious point that the control signal must be a digital signal, but offers no rebuttal construction. To properly construe "control signal," one need look no further than the plain language of claims 1 and 11. Both claims recite "control

means…<u>to generate digitally</u>…a control signal for application to the control input of the converter…." Because the control signal is generated "digitally," it must be a digital signal.

IV.   THE PROPER CLAIM CONSTRUCTIONS FOR THE '056 PATENT

A.   Background of the '056 Patent

The '056 patent was filed on December 8, 1987 and issued on March 14, 1989. The patent expired on December 8, 2007. PDIC has asserted means-plus-function claims <u>13</u> and <u>14</u> and method claims <u>18</u>, 20, <u>21</u> and 23 (independent claims underlined). The '056 patent relates to one facet of an algorithm to encode signals for use in data compression. Data compression is used, for example, to compress the size of a digital image, such as a photograph.

One of the most widely known standards for image compression is JPEG. With JPEG, the degree of image compression can be adjusted, allowing a selectable tradeoff between image storage size and image quality. To produce this sliding scale of image compression, JPEG uses a sophisticated mathematical technique called a discrete cosine transformation, or DCT. The practical effect of JPEG is more simple—the more you squeeze a picture with JPEG compression, the more its file size is reduced but the more you degrade its image quality. For this reason, a highly compressed image may look pixelated and blurry, especially when "blown up" to a larger size, as shown below:

The '056 patent purportedly relates to one small part of an image compression algorithm—a modified "Huffman coding" technique. Huffman coding compresses data by using fewer bits to encode more frequently occurring characters, so that not all characters are encoded with a traditional 8 bits (1s and 0s). The basic idea behind Huffman coding is to save space by using fewer bits for more frequently occurring characters.

The '056 patent does not claim Huffman coding used by most JPEG-compliant devices. In regular Huffman coding, which was invented in 1952, smaller codewords are used to encode common signal values, while longer codewords are used to encode less common signal values. The '056 patent, on the other hand, describes a coding technique where fixed-length codewords are used for extremely uncommon values. The '056 patent also describes using a Huffman-coded prefix for each of those fixed-length code words. Each of these three concepts is addressed briefly below. The '056 patent describes the modified Huffman coding technique with a signal that contains 272 different signal values—32 different non-zero values and 240 different zero run lengths (zero run lengths 1 through 240). The signal being encoded is analyzed to rank the probability of occurrence of each of the non-zero values and the zero run lengths. It is then determined that all 32 non-zero values and zero run lengths of 1 through 35 and 240 are common enough for efficient Huffman coding. It is further determined that zero run lengths of 36-239 are too uncommon for efficient Huffman coding because they would require very long codewords.

A First Set of Huffman Codewords: For the common signal values, Huffman codewords are generated and then stored in a look-up table in ROM 200. Ex. D, '056 patent 6:3-8. The common signal values are the 32 non-zero values and zero run lengths of 1-35 and 240. The Huffman codewords are shown in Table V of the '056 patent, where the signal values are ranked in decreasing order of probability of occurrence. As the probability of occurrence decreases, the size of the Huffman codeword increases. For example, the first ranked signal condition, a non-zero value -7, is assigned the shortest Huffman codeword of "00." Ex. D, '056 patent 8:21. The

71st ranked signal condition, a zero run length of 35, is assigned the longest Huffman codeword of "0111010000." Ex. D, '056 patent 9:16.

A Second Set of Fixed-Length Codewords: For the uncommon signal values, fixed-length codewords are generated and stored in the look up table in ROM 200. Ex. D, '056 patent 6:3-8. The uncommon signal values are zero run lengths of 36 through 239. These fixed-length codewords are shown in Table IV of the '056 patent, where the length of each codeword is fixed at 13 bits regardless of probability of occurrence. For example, a zero run length of 36 is assigned the 13-bit codeword "0101100000000" ('056 patent 7:66) and a zero run length of 239 is assigned the 13-bit codeword "0101111010011" ('056 patent 8:13).

A Huffman Coded Prefix: Each 13-bit codeword in the second set of codewords consists of two parts—a common 5-bit prefix ("01011") and an 8-bit binary code for the number of zeros (36-239 zeros). The individual probability of occurrence of any one of these values is extremely low, but the cumulative probability is significant. That cumulative probability is used to Huffman-code the prefix with the more common signal values in Table V.

B.   Disputed Claim Terms for the '056 Patent

1.   The Preambles of Claims 13, 14, 18 and 21 Are Limiting

When the preamble of a patent claim is more than "simply an introduction to the general field of the claim," but instead "states a necessary and defining aspect of the invention," it acts as a limit on the scope of the claim. *Bicon, Inc. v. The Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006). A preamble also is limiting "if it recites essential structure that is important to the invention or necessary to give meaning to the claim." *Id*. at 952 (quoting *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1305-06 (Fed. Cir. 2005)). "When the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects." *Bell Comm Research,*

Inc. v. Vitalink Comm Corp., 55 F.3d 615, 620 (Fed. Cir. 1995). The clearest case of this occurs when the preamble provides antecedent basis elsewhere in the claim. *Id.*

Here, the preambles of claims 13, 14, 18 and 21 provide antecedent bases for four structures recited in the body of the claims. As a result, the preambles here are "necessary to give life, meaning, and vitality" to the asserted claims. Claims 13, 14, 18 and 21 contain nearly identical preambles that recite language similar to "Apparatus for encoding a digitized signal for transmission over a channel, said signal comprising a plurality of different conditions, each condition having a given frequency of occurrence in said signal, said apparatus comprising." Ex. D, '056 patent, claim 14. Just as the preambles are similar, so too are the claim elements that use the preambles for antecedent basis. Claims 13, 14 and 21 all use the phrase "said signal," which has antecedent basis only in the preamble. Claim 18 uses the phrase "said digital signal," which has antecedent basis only in the preamble. Because "said signal" and "said digital signal" expressly incorporate the claim preambles, the claim preambles are limiting.

The preambles also are limiting because they provide additional structure for the claims used by the patentee to further define the invention. Each claim relates to grouping signal conditions. These signal conditions are only defined in the preambles of claims 13, 14, 18 and 21. Without these definitions in the preambles, the claims lack a necessary structure that all other elements depend on. Accordingly, the patentee chose to define the invention in both the preamble and the body of each claim, which means the preambles are limiting.

> 2. **"condition"/"signal condition"/"signal value - conditions"/"signal conditions"/"signal values"/"values of said signals" (Claims 13, 14, 18, 21)**

Claim Language	Defendants' Construction	PDIC's Construction
A statistical encoder for encoding a digitized signal for transmission over a channel, said signal comprising a plurality of different **conditions**, each **condition** having a different frequency of occurrence in said signal, said encoder comprising	Singular terms: an indivisible unit of the coding scheme representing one unique state of a signal Plural terms: more than one indivisible unit of the coding scheme	Ordinary meaning, no construction necessary.

The parties agree the Court should construe "condition" as a singular "state or value" and "conditions" as plural "states or values." The parties disagree on (1) whether the conditions must be "unique" and (2) whether "condition" and "conditions" when used by themselves in the claims refer to conditions "of a signal."

As to the first issue, the claims require that each claimed condition be a unique state (or value) of the signal. For example, the claims require that each claimed condition be "different" and have its own probability of occurrence. *E.g.*, Ex. D, '056 patent, claim 13. Those claim limitations require that the state of the signal be unique, *i.e.*, unambiguous. For example, assume an input signal has possible conditions of 1, 2, or 3 and the corresponding codewords are a, b, or c, respectively. The conditions 1, 2, and 3 must be unique so that they can have individual probabilities of occurrence and their own uniquely assigned codeword. If condition 1 could not be distinguished from condition 2, it would be meaningless to discuss the probability of occurrence of condition 1 distinct from condition 2 and the entire structure of the claims would fall apart. And if the encoder cannot determine whether the signal state is a 1 or a 2, the encoder cannot determine whether it will output an a or b. Ex. D, '056 patent, claim 18. Thus, the conditions must be unique.

The specification also requires that each condition be "unique," because it expressly defines "condition" to be "different" (that is, unique) states of the signal. Ex. D, '056 patent 18:14-15 ("In the claims, the term 'value' and 'condition' are intended to represent different conditions or states of the signal."). The file history confirms that each condition must be "unique." The applicants relied on an argument that each unique condition needed its own codeword to distinguish the prior art Cox reference. Ex. E, March 31, 2012 Response at 2-3 (Cox did not disclose the express language of the claims because Cox did not have enough codewords for every unique condition). Thus, the claims, specification, and file history all require that each condition be different, *i.e.*, unique.

As to the second dispute, the term "condition" is always used in the claims to refer to a condition "of a signal" even when the claims do not expressly recite "of a signal." For example, claim 14 recites "a first plurality of signal conditions, each codeword representing a different condition." Ex. D, '056 patent, claim 14. The second use of the term "condition" does not state "of a signal" but the context of the claim requires that result. The term "condition" is never used in the claims to refer to anything other than conditions "of a signal." Moreover, the specification expressly includes "of the signal" in its definition of "condition." Ex. D, '056 patent 18:14-15 ("In the claims, the term 'value' and 'condition' are intended to represent different conditions or states <u>of the signal</u>."). There is no reason to leave any ambiguity in the Court's construction.

3.   "codeword"/"word" and "codewords"/"words" (Claims 13, 14, 18, 21)

Claim Language	Defendants' Construction	PDIC's Construction
"codeword" / "word"	an indivisible unit of the coding scheme representing one unique state of a signal	Ordinary meaning, no construction necessary.
"codewords" / "words"	more than one indivisible unit of the coding scheme	Ordinary meaning, no construction necessary.

The Court should construe the "codeword(s)" terms to resolve two claim construction disputes. First, the Court should confirm that when the claim uses the singular "codeword" or "word" it means one codeword and when it uses the plural "codewords" it means more than one codeword. Second, the Court should confirm that "codeword" is entitled to its ordinary meaning in the art consistent with the claims and specification; that is, an "indivisible unit of the coding scheme representing one unique state of a signal." Ebrahimi Decl. at ¶¶ 40. This is necessary because the parties disagree on the distinction between one codeword and two codewords.

The distinction between the singular and the plural is central to the encoding scheme disclosed and claimed in the '056 patent. The claims sometimes recite a single codeword and other times recite plural codewords, so the Court's construction should distinguish between the two. PDIC agreed with the distinction between the singular and plural "condition(s)" terms. But when it comes to "codeword(s)," PDIC reverses course, apparently wanting to confuse the jury

about the fundamental difference between one and two codewords. Defendants' proposal

properly reflects the claimed distinction with "unit" in the construction of "codeword" and "more

than one…unit" in the construction of "codewords."

Defendants' proposed construction as "an indivisible unit of the coding scheme

representing one unique state of a signal" properly reflects the ordinary meaning of "codeword"

to one of skill in the art and is consistent with the intrinsic evidence. Ebrahimi Decl. at ¶¶ 40-44.

The claims expressly require a one-to-one relationship between the claimed "conditions" and

claimed "codewords," because each condition must be assigned its own codeword. Ex. D, '056

patent 20:42-32; 21:42-45. The specification distinguishes systems that lack the claimed one-to-

one correspondence, and makes clear that in the "present invention…each codeword represents a

different signal condition." Ex. D, '056 patent 2:20-26; 2:61-64. PDIC relied heavily on the

claimed one-to-one correspondence in the reexamination, arguing that Cox did not anticipate

because it reused the same codeword for multiple conditions. Ex. E, March 31, 2012 Response

at pp. 2-3. The Examiner agreed with PDIC that Cox did not have enough codewords to have

each codeword represent a single condition as required by the '056 claims. *Id*. at 8, 10.

PDIC argues that the Court should give these terms their "ordinary meaning," but PDIC

does not attempt to identify that ordinary meaning. The jury will not understand any "ordinary

meaning" of these terms, so PDIC's proposal should be rejected.

4. "first means responsive to said signal for generating a first set of codewords…" (Claim 13)

Claim Language	Defendants' Construction	PDIC's Construction
first means responsive to said signal for generating a first set of codewords, each representing more commonly occurring zero run length values and non-zero values; the codewords having lengths according to a statistical rule such that the at least	Defendants contend this phrase is subject to 35 U.S.C. § 112(6). ***Function:*** responsive to said signal for generating a first set of codewords, each representing more commonly occurring zero run length values and non-zero values; the codewords having lengths according to a statistical rule such that the at least generally less commonly occurring words are longest and the at least generally most commonly occurring	PDIC contends that this phrase is governed by 35 U.S.C. § 112, ¶ 6, but disagrees with Defendants' identification of the function. PDIC believes that only a portion of this phrase is the identified function: **Function**: "generating a first set of codewords"

Claim Language	Defendants' Construction	PDIC's Construction
generally less commonly occurring words are longest and the at least generally most commonly occurring words are shortest	words are shortest **The Function Should be Construed as:** in response to the signal to be encoded, creating a first group of codewords in memory according to the following criteria: 1) each codeword represents both common zero run length values and common non-zero values, 2) the at least generally less commonly occurring codewords are longest and the at least generally most commonly occurring codewords are shortest *Structure:* **none disclosed.** *Alternatively:* **To the extent the Court rules that the function is similar to:** in response to the signal to be encoded, outputting codewords according to the following criteria: 1) each codeword represents common zero run length values or common non-zero values, 2) the at least generally less commonly occurring codewords are longest and the at least generally most commonly occurring codewords are shortest; then the corresponding structure would be: sections 501 and 502 of ROM 200, which includes Tables I and II and the 240 codeword of Table III; registers 202 and 206; counter 228; switch 230; logic gates 208-226	**Structure**: a memory device as shown and described at Fig. 2 (200), Col. 11, ll. 18-19, Col. 12, ll. 57-64, Col. 13, ll. 53-54, and statutory equivalents thereof. **The phrase, including the function, should be construed as**: "in response to a digitized signal that has a plurality of conditions, outputting a first set of codewords, the first set of codewords representing conditions that correspond to zero run length values and non-zero values that generally occur more commonly than conditions represented by codewords in a second set of codewords; the codewords in the first set having lengths determined according to a statistical rule such that the less commonly occurring codewords in the first set are longer than the more commonly occurring codewords in the first set"

The parties agree that this is a means-plus-function limitation. The parties disagree on the identification of the claimed function, the construction of that function, and the corresponding structure.

a.   The Proper Function of the "First Means"

Defendants correctly identify the function of the "first means," which includes the entire phrase starting immediately after the words "first means" and ending with "at least generally most commonly occurring words are shortest." The entire phrase is part of the function because the entire phrase qualifies the first set of codewords being generated. PDIC has no basis to select the six words "generating a first set of codewords" out of the middle of that phrase and try to use that as the function by itself. Merely generating any random set of codewords is not sufficient. The generation must be "responsive to said signal" and satisfy all of the characteristics of the codewords recited in this limitation.

"Generating a first set of codewords" means "creating a first group of codewords in memory." This is the most straightforward construction of the claim language, which requires generation of a "set" of codewords. PDIC proposes changing "generating a first set of codewords" to "outputting a first set of codewords." There are several problems with PDIC's proposal. First, other claims recite "outputting" when that is the intended function. Ex. D, '056 patent, claim 18. Second, the specification never discusses outputting a "set" of codewords. Codewords are output individually as needed. Thus, PDIC's proposed construction excludes the preferred embodiment. The remainder of the claimed function consists of several elements that are addressed in other sections of this brief as individual phrases.

b.   The Proper Corresponding Structure of the "First Means"

If the Court construes the "generating a first set of codewords" function as "creating the set of codewords," *i.e.*, creating the codeword tables, the parties agree there is no corresponding structure disclosed in the specification. Ebrahimi Decl. at ¶ 50-54. PDIC does not identify any corresponding structure for creating the tables. And during examination of the '056 patent, the Examiner found that "Table V does not clearly point out how the codewords are generated." Ex. F, June 8, 1988 Office Action at 3. This lack of structure means that the claim is indefinite.

Alternatively, if the Court construes "generating" as "outputting," the parties are relatively close to identifying the same structure. All parties identify ROM 200. Defendants properly clarify that the structure includes subsections 501 and 502 of that ROM. All parties identify certain tables of codewords that are stored in ROM 200. Ebrahimi Decl. at ¶ 47. Defendants correctly identify Tables I, II, and the 240 codeword of Table III. *Id.* at ¶ 48. PDIC indirectly identifies those three tables by referencing column 11, lines 18-19, which states "In FIG. 2, ROM 200 thus includes one dictionary table comprising the information of Tables I, II and III." By doing so, PDIC erroneously identifies all of Table III, which includes the prefix keyword. The prefix keyword is not a "codeword," is not part of the "first set of codewords,"

and does not "represent more commonly occurring zero run length values and non-zero values,"
all of which are required by the claimed function. Third, all parties identify addressing
structures. Defendants identify registers 202 and 206; counter 228; switch 230; logic gates 208-
226, which is the relevant addressing logic that will cause ROM 200 to output a codeword.
PDIC identifies column 12, lines 57-64, which only includes the last part of that logic, a 10-bit
address applied to ROM section 502 to perform a table lookup in only Tables II and IV. The
Court should reject PDIC's partial identification of the addressing logic.

5. "more commonly occurring zero run length values and non-zero values" (Claim 13)

Claim Language	Defendants' Construction	PDIC's Construction
first means responsive to said signal for generating a first set of codewords, each representing <u>more commonly occurring zero run length values and non-zero values;</u>	indefinite; alternatively: zero run length values and non-zero values that occur more commonly than at least one other zero run length value and one other non-zero value	PDIC disputes that this phrase is indefinite, particularly when viewed in context of the larger phrase (#6) in which it appears. To the extent the Court determines that a separate construction is needed outside of the context of the larger phrase in which it appears, PDIC proposes: "conditions that correspond to zero run length values and non-zero values that generally occur more commonly than conditions represented by codewords in a second set of codewords"

a. The Phrase "More Commonly Occurring" Is Indefinite

The phrase "more commonly occurring" is indefinite because it is not amenable to
construction. Claims may use terms of degree to define the invention, but the specification must
provide a definitive way to quantify the terms. *Halliburton Energy Services, Inc. v. M-I LLC*,
514 F.3d 1244, 1253 (Fed. Cir. 2008). Here, the specification does not disclose what numerical
value the zero run length values and non-zero values must be "more common than" to be
included in the first set. Accordingly, claim 13 is invalid as indefinite.

It is not the case that the plain words of claim 13 have no possible meaning, but rather
that a person of skill in the art cannot discern the bounds of these imprecise terms. In this
situation, a claim "is still indefinite if a person of ordinary skill in the art cannot translate the
definition into meaningfully precise claim scope." *Halliburton*, 514 F.3d at 1251. Here, "more

commonly" must refer to some value or quantity that one of skill in the art can use as a benchmark to determine the claim scope. *Id.; see also Storm Products, Inc. v. Ebonite Intern., Inc.,* 2009 WL 2147209, *5-9 (D. Utah 2009), *aff'd*, 2010 WL 1838936 (Fed. Cir. May 7, 2010).

In *Storm Products*, a district court was confronted with a similar situation and found the claim indefinite, which the Federal Circuit upheld:

> With no guidance as to what the term "large number of bowlers" means, it could potentially be any number of bowlers over one. For example, one skilled in the art of providing bowling balls for testing by potential customers might consider ten bowlers to be "a large number of bowlers" in some circumstances or one hundred bowlers as "large" in others. But it is equally plausible that one skilled in the art might consider ten or one hundred bowlers to be a small number of bowlers in other contexts.… Nothing in the intrinsic evidence of the '343 patent or in the extrinsic evidence offered by Ebonite provides sufficient support for how one skilled in the art would be able to determine what the circumstances are to allow an objective conclusion of what number of bowlers would fall within or outside the boundary of the patent, which is described only as a "large number."

Id. The court found that imprecise language related to a number of bowlers, which depends on a relationship to an undefined reference, did not give one of ordinary skill in the art guidance to determine the meets and bounds of the claimed invention. *Id.*

As in *Storm Products*, the '056 claims fail to provide any guidance about what it means to be "more commonly occurring zero run length values and non-zero values." The specification is of no help either, because it discloses only a general description of one example of choosing codewords for the first set:

> In FIG. 4, curve p represents the probability of occurrence of zero run lengths. Zero run lengths having values in the range from 1-35, curve p portion p_4, for example, have relatively higher probability of occurrence as compared to run lengths of 36-239, curve p portion p_1. The run lengths of 1-35 have an area under the curve p, portion p_4 which is about 85% of the area under the entire curve p. The probability of occurrence of zero run lengths between 36 and 239 zeros decreases gradually as shown by curve p portion p_1. The combined probability of occurrence p_p of all run lengths

> corresponds to the area under curve portion p_1 is a fraction of the area under curve p. Probability p_p represents a relatively small portion of the area under the entire probability curve p excluding zero run length 240. The area under curve portion p_1 represents about 15% of the area under all of curve p, by way of example.

Ex. D, '056 patent 9:18-65; Fig. 4. In Figure 4, 240 zero run length values are possible and the

zero run lengths under portion p_1 are included in the first set. The specification provides no

explanation for choosing the area only under p_1 (15 percent of the total area), and the patent fails

to disclose if this graph, percentage, or number is critical or even relevant to determining which

zero run length values belong in the first set. It is just one example for one type of signal. The

'056 patent, however, "is not so limited [to a specific digital signal] and may be applied to any

kind of digital signal." Ex. D, '056 patent 5:5-7. Thus, other digital signals may have different

numbers of potential zero run length values. For these other digital signals, one of skill in the art

would have no way of knowing how to define the first set of codewords.

In short, the phrase "more commonly occurring" is meaningless without being "more

commonly occurring" than something else. Neither the claim language nor the specification

provide that something else. Claim 13 is therefore invalid as indefinite.

b.   PDIC's Construction Attempts to Rewrite the Claim Language of Claim 13

In an effort to avoid indefiniteness, PDIC tries to rewrite the claim language. PDIC then

attempts to support its construction by saying it should be "viewed in context of the larger phrase

(#6) in which it appears." The first means phrase states, in its entirety:

> …first means responsive to said signal for generating a first set of codewords, each representing <u>more commonly occurring zero run length values and non-zero values</u>; the codewords having lengths according to a statistical rule such that the at least generally less commonly occurring words are longest and the at least generally most commonly occurring words are shortest….

Ex. D, '056 patent, claim 13 (emphasis added). Other than the additional ambiguity added from

the last phrase of this means clause, there is nothing whatsoever to provide any context to what

the zero run length values occur "more commonly" than.

PDIC's citations to the specification fare no better. For example, PDIC alleges that the

following citation supports its construction:

> These signal conditions may, for example, be descriptive of (a)
> non-zero values of the information signal after coarse quantization,
> and (b) of more frequently encountered run lengths of zero values
> of the information signal after coarse quantization.

Ex. D, '056 patent 2:65-3:1 (emphasis added).

> It is statistically known that for certain video frames, as for
> example, in teleconferencing systems, the majority of the frame
> information does not change from one frame to the next. Thus, in
> interframe DPCM, where the predictor delays samples from the
> previous frame for a frame time are used to predict corresponding
> samples in the current frame, the resulting error signal tends to
> contain relatively long zero run lengths. Statistically, it can be
> shown that runs of zeros of different lengths have different
> frequencies of occurrence.

Ex. D, '056 patent 5:11-21 (emphasis added). Neither of these passages clarifies what "more

commonly occurring" means in claim 13. PDIC also injects an additional limitation into its

construction to require that the first set of codewords "generally occur more commonly than

conditions represented by codewords in a second set of codewords." Not only does this import

unsupported limitations into the claim, but it also fails to provide any clarity. That is, the

codewords of the second set are defined in the claim as "representing less commonly occurring

zero run length values." What the zero run length values here occur less than is not at all clear,

but even if it were in relation to the first set there is still no guidance as to which codewords are

grouped in the first set as compared to the second set. PDIC's proposal does not avoid

indefiniteness and attempts to import extraneous limitations and verbiage into the claim.

6.   **"a statistical rule such that the at least generally less commonly occurring words are longest and the at least generally most commonly occurring words are shortest" (Claim 13)**

Claim Language	Defendants' Construction	PDIC's Construction
the codewords having lengths according to <u>a statistical rule such that the at least generally less commonly occurring words are longest and the at least generally most commonly occurring words are shortest</u>	indefinite; alternatively: an imprecise rule that generally requires that the values that are less common to occur be represented by the longest codewords and the values that are most common to occur be represented by the shortest codewords	PDIC disputes that this phrase is indefinite, particularly when viewed in context of the larger phrase (#6) in which it appears, and does not believe that the phrase should be construed outside the context of the larger phrase. To the extent the Court determines that a separate construction is needed outside of the context in which it appears, PDIC proposes: "a statistical rule such that the less commonly occurring codewords in the first set are longer than the more commonly occurring codewords in the first set"

As discussed above, the terms "at least generally less commonly occurring" and "at least generally most commonly occurring" render claim 13 indefinite. These claim phrases involve even more words of approximation and relation that indicate no reference point and no guide for one of skill in the art to determine the metes and bounds of claim 13.

The words of claim 13 preceding the "statistical rule" language refer to the "more commonly occurring" values, which as explained above, provide no clarity to what words are more likely to occur than an unidentified number of other words. The "statistical rule" takes this language a step further and adds "at least generally" before "less commonly occurring" and "most commonly occurring." This added ambiguity serves to further muddy the waters of the claim language and renders claim 13 indefinite.

a.   **PDIC's Proposed Construction is Nonsensical**

In another attempt to save claim 13 from being indefinite, PDIC proposes a tortured interpretation of what the statistical rule should mean. In doing so, PDIC proposes an inoperable construction that reads out the claim term "generally." That is, PDIC redefines it to mean a strict rule such that the codewords that occur most often are the shortest and the codewords that occur least often are the longest. However, this is not what is claimed nor what is disclosed in the '056 patent. Tables I, II, and V in the specification demonstrate that some codewords have the same

length as other codewords, even though each codeword may have a different probability of occurrence. For example, non-zero values 22 and 27, along with zero run length values 4, 5 and 6, all have the same six-bit code length even though they each have a different probability of occurrence. PDIC's construction would exclude this embodiment, which is the only embodiment disclosed in the specification. Thus, PDIC's attempt to salvage the validity of claim 13 reads out the only disclosed embodiment and is therefore improper.

b.   Defendants' Alternative Construction Is Consistent with The Preferred Embodiment

In contrast to PDIC's proposed construction, Defendants' alternative construction allows for codewords of different probabilities of occurrence to have the same code length. To capture this feature of the patent, however, Defendants' construction uses the words "imprecise rule" and "generally requires." Although not staples of patent law claim construction, these terms are nevertheless necessitated by the language of claim 13 and are the only interpretation that would not render the claim language impossible to construe. Thus, if the Court does not find claim 13 indefinite on this basis, the Court should adopt Defendants' construction.

7.   "second means responsive to said signal for generating a second set of codewords…" (Claim 13)

Claim Language	Defendants' Construction	PDIC's Construction
second means responsive to said signal for generating a second set of codewords, each word of said second set of words representing less commonly occurring zero run length values, the codewords of the second set each comprising the same prefix keyword code having a length assigned according to the statistical rule with said first set of codewords and a	Defendants contend this phrase is subject to 35 U.S.C. § 112(6). *Function:* responsive to said signal for generating a second set of codewords, each word of said second set of words representing less commonly occurring zero run length values, the codewords of the second set each comprising the same prefix keyword code having a length assigned according to the statistical rule with said first set of codewords and a suffix of such length that the prefix and suffix together have length outside said statistical rule **The Function Should be Construed as:** in response to the signal to be encoded, creating a second group of codewords in memory according to the following criteria: 1) each codeword corresponds to a zero run length value occurring	PDIC contends that this phrase is governed by 35 U.S.C. § 112, ¶ 6, but disagrees with Defendants' identification of the function. PDIC believes that only a portion of this phrase is the identified function: **Function**: "generating a second set of codewords" **Structure**: a memory device as shown and described at Fig. 2 (200), Col. 11, ll. 18-19, Col. 12, ll. 57-64, Col. 13, ll. 53-54, and statutory equivalents thereof. **The phrase, including the function, should be construed as**: "in response to the digitized signal that

Claim Language	Defendants' Construction	PDIC's Construction
suffix of such length that the prefix and suffix together have length outside said statistical rule	less often than the zero run length values in the first set, 2) each codeword includes the same prefix keyword code, 3) the length of the prefix keyword code is assigned according to the statistical rule with said first set of codewords and a suffix of such length that the prefix and suffix together have length outside said statistical rule *Structure*: none disclosed. *Alternatively*: To the extent the Court rules that the function is similar to: in response to the signal to be encoded, outputting codewords according to the following criteria: 1) each codeword represents a less commonly occurring zero run length value, 2) each codeword include the same prefix keyword code, 3) the length of the keyword code is assigned according to the statistical rule with said first set of codewords and a suffix of such length that the prefix and suffix together have length outside said statistical rule; then the corresponding structure would be the following portions of the encoder 28: section 502 of ROM 200, which includes Table IV; registers 202 and 206; counter 228; switch 230; logic gates 208-226	has the plurality of conditions, outputting a second set of codewords, the second set of codewords representing conditions that correspond to zero run length values that generally occur less commonly than conditions represented by the codewords in the first set of codewords; each codeword in the second set includes the same prefix keyword code; the prefix keyword code has a length determined according to the probability of occurrence of the prefix keyword code in relation to the probabilities of occurrence of the codewords in the first set; and each codeword in the second set has a suffix of such length that the total number of bits for the prefix keyword code and suffix together does not follow the statistical rule where the at least generally less commonly occurring codewords are longest and the at least generally most commonly occurring codewords are shortest"

The parties agree this is a means-plus-function limitation subject to 35 U.S.C. §112(6). The parties disagree on the identification of the claimed function, the construction of that function, and the corresponding structure.

a.   The Proper Function of the "Second Means"

The parties have the same dispute here as with the "first means." Defendants properly identify the entire function, which includes the fact that the generating is "responsive to said signal" and specifies the characteristics of the generated set of codewords. PDIC again selects "generating a second set of codewords" out of the middle of the function, which would include generating any random set of codewords. Thus, "generating a second set of codewords" means "creating a first group of codewords in memory" for the reasons provided above with respect to the "generating a first set of codewords" limitation.

b.   The Proper Corresponding Structure of the "Second Means"

If the Court construes the "generating a second set of codewords" function as "creating the second of codewords," *i.e.*, creating the codeword tables, there is no corresponding structure disclosed in the specification, as explained above with respect to "generating a first set of codewords" limitation. Alternatively, if the Court construes "generating" as "outputting," there is a significant dispute about the corresponding structure. All parties identify ROM 200. Defendants correctly clarify that the structure includes subsection 502 of that ROM. All parties also identify certain tables of codewords that are stored in ROM 200, but disagree on which tables correspond to the second set of codewords. Ebrahimi Decl. at ¶ 47. Defendants directly reference Table IV, which includes the 204 codewords that correspond to the claimed "second plurality of codewords representing a second plurality of signal conditions." *Id.* at ¶ 49. PDIC incorrectly identifies Tables I, II and III—the same tables PDIC identified for the first set of codewords. None of Tables I, II, or III contain any of the second plurality of codewords. For example, the claim expressly recites that "the codewords of the second set each comprising the same prefix keyword code…and a suffix…." But none of the codewords in Tables I, II, or III contain both a prefix and suffix. Not only does PDIC include the wrong tables, PDIC fails to identify Table IV. Thus, PDIC's proposed structure could never perform the function of outputting the second set of codewords. Ebrahimi Decl. at ¶ 49. Third, all parties identify the addressing structures. The Court should adopt Defendants' complete construction and reject PDIC's incomplete one, for the reasons demonstrated above in the "first means" limitation.

8.   "prefix keyword code" (Claim 13)

Claim Language	Defendants' Construction	PDIC's Construction
the codewords of the second set each comprising the same <u>prefix keyword code</u> having a length assigned according to the statistical rule with said first set of codewords and a suffix of such length that the prefix and suffix together have length outside said statistical rule	"a first plurality of bits that is not a codeword and indicates that what follows is to be treated as a suffix as opposed to a codeword"	"special code that is the initial portion of a codeword"

The "prefix keyword code" by itself is insufficient to denote a complete codeword. Ebrahimi Decl. at ¶ 45. That is, it has no usable value in the coding scheme and does not represent any specific value. Defendants' construction captures this unique characteristic, while PDIC simply calls the term "special." The term "prefix keyword code" is defined in the specification as indicating a departure from the coding scheme:

> The key codeword is an indication of a departure from straightforward Huffman coding, to prepare an alternative coding scheme for developing a longer codeword which uses the key codeword as a prefix portion of that longer codeword. A unique suffix codeword segment follows the key codeword prefix for particularly identifying each member of the subgroup.

'056 patent, Abstract.

> The first group of codewords, for example, may include a key codeword that signals a change in the coding procedure from statistical coding using the first group of codewords to the use of a different coding scheme using a codeword drawn from the second group of codewords. Each codeword in the second group, in this example, may include the key codeword as a prefix codeword segment followed by a suffix codeword segment.

'056 patent 3:7-15. The patent further defines the characteristics of the "prefix keyword code" as a unique first plurality of "digits of the codeword [such that] no other complete five digit code of any of the other codewords is included in the initial portion of the codeword comprising the keyword." Ex. D, '056 patent 10:26-31. Thus, the "prefix keyword code" is unique so that it cannot be mistaken by the coder for a codeword. Ebrahimi Decl. at ¶ 45.

To be used by the coder, the "prefix keyword code" must be followed by "an additional code to be used as a suffix after the n-bit keyword." Ex. D, '056 patent 10:35-36. Not until the suffix is added to the "prefix keyword code" does the sequence become a usable codeword. *Id.* at 10:33-58. Therefore, neither the "prefix keyword code" nor the suffix is an actual codeword usable by the claimed system; the "prefix keyword code" only indicates to the coder that a suffix

will follow next, and a departure from the coding scheme is necessary. Defendants' construction follows this express teaching from the specification.

PDIC's construction fails to accurately describe what a "prefix keyword code" is and what purpose it has in the coding scheme. First, PDIC's construction states that the "prefix keyword code" is a "special code." The specification includes a table of "special codes," but Table III includes more than just the prefix keyword code. When referring to the prefix keyword code, the specification uses the term "special code" merely as prefatory language before describing what a keyword code actually is: "the term keyword…implies that a special code is employed for each zero run length value for all members of the group in portion p_1 of the curve p." *Id.* at 9:67-10:2. This does nothing to describe what a "prefix" keyword code is, however, and leaves the jury to resort to the specification to determine what is "special."

Second, the remainder of PDIC's construction, "the initial portion of a codeword," does not limit the term to what is described in the specification. In fact, almost <u>any</u> codeword would fit this definition if, for example, the bits "01" were considered the prefix keyword code. Not only does this violate the Huffman coding rule with which the "prefix keyword code" must comply, but it would include more than 50 other common codewords that begin with "01" as the first two bits. The specification discloses that a "prefix keyword code" is more than just the initial portion of a codeword. It signals a change in the coding scheme and indicates what follows is a suffix and not a codeword. Ex. D, '056 patent 3:7-15. PDIC's construction therefore cannot be correct.

9.   "suffix" (Claim 13)

Claim Language	Defendants' Construction	PDIC's Construction
the codewords of the second set each comprising the same prefix keyword code having a length assigned according to the statistical rule with said first set of codewords and a <u>suffix</u> of such length that the prefix and suffix together have length outside	a second plurality of bits that follows the prefix and is treated differently than a codeword	Ordinary meaning, no construction necessary. To the extent that the Court determines that a separate construction of this term is needed, PDIC proposes: "a plurality of bits that follows the prefix"

Claim Language	Defendants' Construction	PDIC's Construction
said statistical rule		

Like its construction for "prefix keyword code," PDIC's construction of "suffix" fails to

describe the purpose and function of that term. All parties agree that the "suffix" is at least a

"plurality of bits that follows the prefix." PDIC's construction, however, includes nothing to

specify that the plurality of bits following the prefix is a "suffix" and not just another codeword.

Ebrahimi Decl. at ¶ 46.

To solve the ambiguity in PDIC's construction, Defendants' construction specifies that

the "suffix" is "treated differently than a codeword." The specification supports this description:

> Each codeword in the second group, in this example, may include
> the key codeword as a prefix codeword segment followed by a
> suffix codeword segment.

Ex. D, '056 patent 2:12-15 (emphasis added).

> Thus, a separate, different, unique 8-bit code can be assigned each
> member of the zero run length group under portion p.sub.1 of the
> probability curve p. That 8-bit code is added as a suffix to the n-
> bit keyword described above producing an m-bit codeword, e.g., a
> 13-bit codeword.

Id. at 10:45-51 (emphasis added).

> The key codeword is an indication of a departure from
> straightforward Huffman coding, to prepare an alternative coding
> scheme for developing a longer codeword which uses the key
> codeword as a prefix portion of that longer codeword. A unique
> suffix codeword segment follows the key codeword prefix for
> particularly identifying each member of the subgroup.

Id., Abstract (emphasis added). The specification discloses that a "suffix" is only a segment or

part of a codeword. Id. Defendants' construction follows these express teachings in the

specification. PDIC attempts to broaden the meaning of suffix without any support.

10.   The "grouping" terms (Claims 14, 18, 20, 21, 23)

Claim Language	Defendants' Construction	PDIC's Construction
"grouping"	organizing together in memory	designating as a member of a group

"Grouping" as used in the claims means "organizing together in memory." There is no support for PDIC's proposed construction of "designating as a member of a group," which excludes all embodiments disclosed in the '056 patent. The claims, specification and file history all demonstrate that the claimed "grouping" is literally a grouping of actual codewords, which in the context of the claimed encoder means organizing in memory.

The act of "grouping" is recited in the claims as a function of the apparatus claim (*e.g.*, claim 14) and a step of the method claims (*e.g.*, claims 18, 21), and is always part of a larger phrase referring to the act of grouping a first set of codewords according to a first criteria and grouping a second set of codewords according to a second criteria. The parties agree that the act of "grouping" should be construed consistently in the claims, so Defendants will address the act of "grouping" in the context of the larger phrase in claim 18.

The plain language of the claims requires that "grouping" means "organizing together in memory." For example, claim 18 expressly recites the act of "grouping a plurality of different codewords of different codelengths into first and second groups…." Ex. D, '056 patent, claim 18. Clearly, the members of the group, *i.e.*, the codewords themselves, must exist so the claimed act of grouping into two groups can occur. After the claimed grouping, claim 18 claims the step of "causing a memory means…to output that codeword corresponding to the input digitized signal condition." *Id*. Thus, each of the codewords must exist in memory so that the codeword corresponding to the input can be output by the memory.

The specification confirms that "organizing together in memory" is the correct construction. The patent discloses a single table with the codewords of both groups organized in memory to avoid any wasted overhead. Ex. D, '056 patent 6:3-10; 9:48-50. All of the codewords must exist to be grouped. *Id*. at Table II, IV, V; 10:52-54 ("A different 13-bit codeword is assigned each of the 204 members and is represented by the codeword 01011x1…xn in Table V.") In fact, PDIC admits that with respect to the function of "grouping" in claim 14,

the corresponding structure includes the tables in memory that store the codewords. Thus, PDIC

cannot now contend that an abstract, mental step of "grouping" satisfies the claimed act.

The PTO confirmed during the reexamination of the '056 patent that each of the

codewords must exist and be grouped into the two groups, i.e., organized in memory. The prior

art references (Hankamer and Cox) taught that all of the codewords of both groups could be

grouped in memory, but it would save memory to generate the individual codewords of the

second group as necessary on output. The Examiner considered the issue and found that

generating the codewords individually for output was not the claimed "grouping":

> Hankamer discloses grouping this second group of codewords in
> ROM and notes that ROM is inexpensive. Hankamer at 932.
> Hankamer teaches, however, that grouping this second group of
> codewords wastes memory. Id. Hankamer teaches that it is
> preferable to output the second set of codewords individually
> during encoding, i.e., without ever grouping them. Id.

Ex. G, January 10, 2012 Office Action at 18 (rejecting claim 18 over Hankamer).

> Cox teaches a code table as the means for grouping the codewords.
> Cox at 334. Cox also teaches that preferably the second plurality
> of codewords need not be actually grouped.

Id. at 7, 12. The Examiner's reasoning is part of the intrinsic record and confirms that

"grouping" means organizing in memory. PDIC's reliance on this statement to distinguish prior

art during reexamination estops it from arguing to the contrary now. Ex. H, February 21, 2012

Response at 9-12; *see also Am. Piledriving Equip., Inc., v. Geoquip, Inc.*, 637 F.3d 1324, 1336

(Fed. Cir. 2011) (applicant's claim construction arguments during reexamination to distinguish

prior art served as disavowal of broader claim scope).

PDIC's proposal is ambiguous about whether its proposed "designation" occurs in the

memory where the codewords are stored or whether it occurs when the codewords are output.

Either interpretation of PDIC's proposed construction would exclude all disclosed embodiments,

resulting in the claims being invalid under 35 U.S.C. § 112. The '056 patent discloses that the

table used by the encoder to organize the two groups of codewords in memory has no overhead

for "designating" codewords as a member of a group:

> In FIG. 2, ROM 200 contains an encoder look up table which is
> established in accordance with the principles of the present
> invention. The table stored in ROM 200 is a single table for
> transmission purposes but is presented below for purposes of
> description as Tables I, II, III and IV. A single table implies that
> any portion of the table can be transmitted to the receiver without
> additional overhead to decipher the table.

Ex. D, '056 patent 6:3-10. Similarly, the '056 patent discloses that there is no wasted overhead

in the transmission bandwidth for "designating" codewords as they are output:

> The additional of even one bit of additional information as
> overhead in the transmission system can have significant effects in
> reducing the efficiency of transmission.

> For example…the addition of a single bit for that most frequently
> occurring codeword decreases the transmission efficiency of that
> codeword by 50%, and defeats the purpose of making the most
> frequently occurring codewords as short as possible…. [T]hese
> suffer similar drawbacks in also requiring additional overhead
> between the transmitter and receiver, detracting from the system
> efficiency or generating codewords that may be excessively long.

Id. at 2:23-40. Because this construction would exclude all disclosed embodiments, it would

result in the claim being invalid and, therefore, should be avoided if possible.

11.   "first means for grouping…" (Claim 14)

Claim Language	Defendants' Construction	PDIC's Construction
first means for grouping, for a first given number of members, a first plurality of codewords representing a first plurality of signal conditions, each codeword representing a different condition, according to a first range of frequencies of occurrence of the condition of said	Defendants contend this phrase is subject to 35 U.S.C. § 112(6). *Function:* grouping, for a first given number of members, a first plurality of codewords representing a first plurality of signal conditions, each codeword representing a different condition, according to a first range of frequencies of occurrence of the condition of said signal, said first plurality comprising codewords of differing lengths, the shortest codeword occurring most frequently, the largest codeword occurring least frequently *Function should be construed as:* organizing together in memory, for a given number of codewords, a first set of codewords according	PDIC contends that this phrase is governed by 35 U.S.C. § 112, ¶ 6, but disagrees with Defendants' identification of the function. PDIC believes that only a portion of this phrase is the identified function: **Function**: "grouping, for a first given number of members, a first plurality of codewords representing a first plurality of signal conditions" **Structure**: a memory device as shown and described at Fig. 2 (200), Col. 11, ll. 18-19, Col. 12, ll. 57-64, Col. 13, ll. 53-54, and statutory equivalents thereof.

| signal, said first plurality comprising codewords of differing lengths, the shortest codeword occurring most frequently, the largest codeword occurring least frequently | to the following criteria: 1) each codeword represents a different condition of a first plurality of conditions according to a first range of probabilities of those conditions and 2) the codewords differ in length with the shortest codeword having the highest probability of occurrence and the largest codeword having the lowest probability of occurrence

Structure: the following portions of the encoder 28: sections 501 and 502 of ROM 200, which includes Tables I and II and the 240 codeword of Table III, and logic structure for addressing ROM 200 in Fig. 2**.** | **The phrase, including the function, should be construed as**:

"designating a first given number of codewords as members of a first group of codewords that represent a first plurality of conditions of a signal according to a first set of probabilities of occurrence of those conditions; each codeword of the first group represents a different condition of the first plurality of conditions; the codewords of the first group differ in length, with the shortest codeword having the highest probability of occurrence and the longest codeword having the lowest probability of occurrence" |

The parties agree that this is a means-plus-function phrase but disagree on the function and the corresponding structure.

a. The Proper Function for the "First Means for Grouping"

The primary dispute regarding the construction of the function relates to the meaning of "grouping." That dispute is addressed above. The rest of the disagreements are minor, and the Court should adopt Defendants' proposed construction because it is more true to the claim language. PDIC once again improperly truncates the claimed function to omit the type of conditions represented by the first set of codewords and to eliminate how the first set is grouped (*i.e.*, according to the statistical rule). The entire phrase is required because the claimed function is to group a particular type of codeword, not just any codewords.

b. The Proper Corresponding Structure for the "First Means for Grouping"

The parties are relatively close to agreement on the corresponding structure. All parties identify ROM 200. Defendants clarify that the structure includes subsections 501 and 502 of that ROM, but this distinction is minor. Also, all parties identify certain tables of codewords that are stored in ROM 200. Ebrahimi Decl. at ¶ 47. Defendants directly reference Tables I, II, and the 240 codeword of Table III. *Id.* at ¶ 48. PDIC includes those tables indirectly by referencing column 11, lines 18-19 which states "In FIG. 2, ROM 200 thus includes one dictionary table

comprising the information of Tables I, II and III." The Court should adopt Defendants'

construction because it more clearly recites the corresponding structure. Also, PDIC erroneously

identifies all of Table III, which includes the prefix keyword. The prefix keyword is not a

codeword representing one of the first plurality of signal conditions as required by the function.

Because the prefix keyword does not satisfy the claimed function, it should not be included as

corresponding structure.

12.   "second means for grouping…" (Claim 14)

Claim Language	Defendants' Construction	PDIC's Construction
second means for grouping, for a second given number of members, a second plurality of codewords representing a second plurality of signal conditions, each second plurality of codeword representing a different condition according to a second range of frequencies of occurrence of the conditions of said signal, the second range of frequency of occurrence having a combined frequency of occurrence lying in the first range, all said codewords of said first and second pluralities being different, each codeword of the second plurality having a common codeword portion length which is statistically based on said combined frequency of occurrence relative to said first range	Defendants contend this phrase is subject to 35 U.S.C. § 112(6). *Function:* grouping, for a second given number of members, a second plurality of codewords representing a second plurality of signal conditions, each second plurality of codeword representing a different condition according to a second range of frequencies of occurrence of the conditions of said signal, the second range of frequency of occurrence having a combined frequency of occurrence lying in the first range, all said codewords of said first and second pluralities being different, each codeword of the second plurality having a common codeword portion length which is statistically based on said combined frequency of occurrence relative to said first range. *Function should be construed as:* organizing together in memory, for a second given number of codewords, a second set of unique codewords according to the following criteria: 1) each codeword in the second set represents a different signal condition within a second range of probability of occurrence of the signal being encoded that by itself is less likely to occur than any codeword in the first set, but the sum of the individual probabilities of the second set of codewords falls within the plurality of individual probabilities for the first set of codewords and 2) ; each codeword of the second set has a portion (a prefix keyword code) which is common to all codeword in the second set, and the common portion (the prefix keyword code) has a length that is determined by the sum of the individual probabilities of the second set of codewords relative to the range of individual probabilities for the first set of	PDIC contends that only a subset of this phrase is subject to 35 U.S.C. § 112(6). **Function**: grouping, for a second given number of members, a second plurality of codewords representing a second plurality of signal conditions **Structure**: a memory device as shown and described at Fig. 2 (200), Col. 11, ll. 18-19, Col. 12, ll. 57-64, Col. 13, ll. 53-54, and statutory equivalents thereof. **The phrase, including the function, should be construed as**: "designating a second given number of codewords as members of a second group of codewords that represent a second plurality of conditions of a signal according to a second set of probabilities of occurrence of those conditions; each codeword of the second group represents a different condition of the plurality of conditions; the second set of probabilities of occurrence having a combined probability of occurrence that is within the first set of probabilities of occurrence; all the codewords of the first group and the second group are different; each codeword of the second group has a portion which is common to the codewords of the second group; the common portion has a length that is statistically based on the combined probability

	codewords **Structure:** the following portions of the encoder 28: section 502 of ROM 200, which includes Table IV, and logic structure for addressing ROM 200 in Fig. 2**.**	of occurrence of the second group of codewords relative to the set of probabilities of occurrence for the first group of codewords"

The parties agree that this is a means-plus-function limitation but disagree on the function and corresponding structure.

a.   The Proper Function for the "Second Means for Grouping"

The primary disputes regarding the construction of the function are discussed above with respect to "grouping." PDIC once again improperly truncates the claimed function for the second means for grouping as described above with respect to the first means for grouping. The Court should adopt Defendants' proposed construction because it is truer to the claim language and includes the entire claimed function of the "second means."

b.   The Proper Corresponding Structure for the "Second Means for Grouping."

All parties identify ROM 200. Defendants properly clarify that the structure includes subsection 502 of that ROM. All parties identify certain tables of codewords that are stored in ROM 200. Ebrahimi Decl. at ¶ 47. Defendants directly reference Tables IV, which includes the 204 codewords that correspond to the claimed "second plurality of codewords representing a second plurality of signal conditions." *Id.* at ¶ 49. PDIC identifies Tables I, II and III—the same tables PDIC identified for the first means for grouping. None of Tables I, II, or III contain any of the second plurality of codewords. Not only does PDIC include the wrong tables, PDIC fails to identify Table IV that includes all of the claimed "second plurality of codewords representing a second plurality of signal conditions." Thus, PDIC's proposed structure could never perform the claimed function. Ebrahimi Decl. at ¶ 49.

13.   "combined frequency of occurrence" (Claims 14, 21)

Claim Language	Defendants' Construction	PDIC's Construction
…each second plurality of codeword representing a different condition according to a second range of	the sum of the probabilities of occurrence of all of the	"combined probability of occurrence of the

Claim Language	Defendants' Construction	PDIC's Construction
frequencies of occurrence of the conditions of said signal, the second range of frequency of occurrence having a <u>combined frequency of occurrence</u> lying in the first range…	codewords in the second plurality of codewords	codewords in the second plurality of codewords"
a second group of different codewords having a codeword portion length such that the combined probability of occurrence value of all of the signal conditions represented by the second group is organized statistically with said first given order codeword length based on said combined probability value regardless the relative codeword lengths of said second group codewords as compared to the codeword length of the next adjacent codewords of the first group	the sum of the probabilities of occurrence of the codewords in the second group	"combined probability of occurrence of the codewords in the second group"

The claim phrases "combined probability of occurrence" and "combined frequency of occurrence" simply mean "the sum of the probabilities of occurrence." PDIC refuses to propose a construction for "combined probability of occurrence" and simply repeats that phrase in its proposed construction. The parties dispute what this phrase means to a person of ordinary skill in the art. The claims require that the codewords of the first type be organized by their individual probabilities of occurrence, and the codewords of the second type be organized by their combined probability of occurrence, *i.e.*, the sum of their individual probabilities. No other meaning of these terms will satisfy those claim requirements.

The '056 specification revolves around organizing a first group of codewords by their individual probabilities and the second group by its "combined probability." The specification is explicit that "combined probability" is to be treated with its ordinary meaning as a sum of the individual probabilities. Ex. D, '056 patent 9:27-33. Figure 4 defines "Pp = AREA UNDER CURVE," and shades the area under the probability curve corresponding to the second group of codewords. The area under a curve is mathematically defined as a sum. In this case, the area under the "probability curve p" is the sum of the probabilities. The specification also discloses that the "combined probability" is the "group probability," which is used to place the second set of codewords as a group relative to the individual probabilities of the first set of codewords. '056 patent 9:50-55. Defendants' construction is the correct one.

14.   "common codeword portion length"/"codeword portion length"/"codeword portion of a length" (Claims 14, 18, 21)

Claim Language	Defendants' Construction	PDIC's Construction
Claim 14 - each codeword of the second plurality having a <u>common codeword portion length</u> which is statistically based on said combined frequency of occurrence relative to said first range. Claim 18 - a second group of different codewords having a <u>codeword portion length</u> such that the combined probability of occurrence value of all of the signal conditions represented by the second group is organized statistically with said first given order codeword length based on said combined probability value regardless the relative codeword lengths of said second group codewords as compared to the codeword length of the next adjacent codewords of the first group; Claim 21 - the codewords of the second group each having the <u>same</u> <u>codeword portion of a length</u> according to said statistical rule and a total length differing from said statistical rule	a first plurality of bits that is not a codeword and indicates that what follows is to be treated as a suffix as opposed to a codeword	"common codeword portion length" means "length of a portion of a codeword that is the same portion included in another codeword" "codeword portion length" and "codeword portion of a length" means "length of a portion of a codeword".

Each claim uses three similar phrases to refer to the same concept—the prefix keyword code of the second group of codewords. Accordingly, Defendants propose the same construction for these terms as for prefix keyword code. The claim phrases in which each of these terms appears relates to the codewords in the second set. As Table IV of the specification confirms, all codewords in the second set are composed of a prefix keyword code and a suffix. For each of these codewords, the prefix keyword code is identical, it does not constitute a codeword by itself, and its length is based on a combined probability of occurrence of the second set of codewords with respect to the first set of codewords. PDIC's construction, on the other hand, omits mention of the function of the "common codeword portions" as a prefix and fails to tie it to the second set of codewords. PDIC's statement that "common codeword portion" is merely the "portion of a codeword that is the same portion included in another codeword" is so open ended that it could apply to any portion, no matter how long or short, of any arbitrary selection of codewords among all sets of codewords. The Court should therefore adopt Defendants' clarifying construction.

15. "a first group of said codewords being organized statistically in a first given order…" (Claim 18)

Claim Language	Defendants' Construction	PDIC's Construction
a first group of said codewords being organized statistically in a first given order in which at least generally the shortest codeword length manifests that signal condition having the greatest probability of occurrence and at least generally the greatest codeword length manifests that signal condition having the lowest probability of occurrence	Indefinite; construction: the codewords of the first group of codewords are organized in memory 1) in order of their probability of occurrence and 2) so the shortest codeword is assigned to a signal condition with the greatest probability of occurrence and the longest codeword is assigned to a signal condition with the lowest probability of occurrence	PDIC disputes that this phrase is indefinite and does not believe that this phrase requires construction, particularly given that one or more terms/phrases within the phrase are already submitted for construction.

With respect to the construction of the phrase, the parties' disputes relate to: (1) the meaning of "a first group of said codewords;" and (2) whether the phrase language is insolubly ambiguous and indefinite. The Court should construe "a first group of said codewords" in claim 18 consistent with "grouping" in claims 14, 18, 20, 21 and 23. Thus, for the same reasons that "grouping" should be construed as "organizing together in memory," as set forth in Section V.C.12, *infra*, "a first group of said codewords" should be construed to mean "the codewords of the first group of codewords are organized in memory…."

Defendants also incorporate by reference their indefiniteness arguments as to claim 13. The phrases "at least generally…having the greatest probability of occurrence" and "at least generally…having the lowest probability of occurrence" are not amenable to construction and render the claim indefinite. *See* Sections V.C.6(i) and V.C.7(i), *infra*.

Claim 18 is indefinite for another reason as well. The claim phrase "a first group of said codewords" is an apparatus limitation within a method claim, rendering claim 18 indefinite. *See IPXL Holdings, L.L.C.*, 430 F.2d at 1384. "[A] first group" does not have antecedent basis in the previous method limitations or preamble, and therefore, stands alone as a separate claim limitation. Accordingly, claim 18 is indefinite.

16.   "a second group of different codewords…" (Claim 18)

Claim Language	Defendants' Construction	PDIC's Construction
a second group of different codewords having a codeword portion length such that the combined probability of occurrence value of all of the signal conditions represented by the second group is organized statistically with said first given order codeword length based on said combined probability value regardless the relative codeword lengths of said second group codewords as compared to the codeword length of the next adjacent codewords of the first group	Indefinite; alternatively: the codewords in the second group each have a common codeword portion length and are organized in memory 1) inside the first group of codewords at a location determined by the sum of the probabilities of occurrence of the codewords in the second group relative to the individual probabilities of occurrence of the codewords in the first group and 2) without regard to the relative total lengths of the codewords in the second group compared to the codeword of the first group stored immediately before the second group and the codeword of the first group stored immediately after the second group.	PDIC disputes that this phrase is indefinite and does not believe that this phrase requires construction, particularly given that one or more terms/phrases within the phrase are already submitted for construction.

With respect to the construction of the phrase, the parties' disputes relate to: (1) the meaning of "a second group of different codewords"; and (2) the meaning of "next adjacent codewords." The Court should construe "a second group of different codewords" in claim 18 consistent with "grouping" in claims 14, 18, 20, 21 and 23. Thus, for the same reasons that "grouping" should be construed as "organizing together in memory," as set forth in Section V.C.12, *infra*, "a second group of different codewords" should be construed to mean "the codewords in the second group each have a common codeword portion length and are organized in memory…." Defendants' position about the meaning of "common codeword portion length" is set forth in Section V.C.16.

The Court should adopt Defendants' construction of "next adjacent codewords," because the applicant argued Hankamer did not anticipate claim 18 based upon the meaning of this phrase. The applicant argued that, in Hankamer, the prefix is stored at the end of the table, so only one codeword is stored adjacent to it. Ex. H, February 21, 2012 Response After Non-Final Rejection at 9-10. The applicant argued that, by contrast, "the keyword prefix in Table V of the '056 patent is adjacent to plural codewords." *Id.* at 10. The Examiner accepted the applicant's

argument, effectively agreeing that the phrase "next adjacent codewords" must be construed to preserve its validity over Hankamer. Ex. I, March 6, 2012 Office Action at 11-13.

In addition, the phrase "a second group of different codewords" renders claim 18 indefinite for at least the same reasons described above for the "a first group" limitation. Further confirming its status as an apparatus element, the patentee separated this phrase from the "grouping" method element with a semicolon and indented the clause as a new element. Because the Court cannot redraft the claim to correct this fatal error, claim 18 is invalid. *See Chef America Inc.*, 358 F.3d at 1374.

17.   "causing a memory means in response to the conditions of said digitized signal applied as an input thereto to output that codeword corresponding to the input digitized signal condition" (Claim 18)

Claim Language	Defendants' Construction	PDIC's Construction
causing a memory means in response to the conditions of said digitized signal applied as an input thereto to output that codeword corresponding to the input digitized signal condition	a memory receives the digitized signal as an input and in response outputs the codeword stored in the memory representing the input digitized signal condition	"causing a memory device, which has data storage elements and associated circuitry to access the stored data, in response to the conditions of the digitized signal applied as an input to the memory device to output that codeword representing the condition of the input digitized signal"

This is a simple claim phrase that should not even require construction. A memory receives a signal condition as an input, and in response to that signal condition, outputs a corresponding codeword. Defendants' construction is straightforward and retains the simplicity of the claim language.

V.   CONCLUSION

For the reasons above, the Court should adopt Defendants' proposed constructions.

Dated: August 29, 2013

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CERTIFICATE OF SERVICE

I hereby certify that on August 29, 2013, I electronically transmitted the attached CORRECTED document to the Clerk's Office using the CM/ECF System for filing and service on registrants.

/s/ Brian K. Erickson
Brian K. Erickson